

# U.S. ARMY NATICK SOLDIER CENTER: DOING SOMETHING FOR THE SOLDIER EVERY DAY

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## Introduction

The Natick Soldier Center (NSC), located at the U.S. Army Soldier Systems Center in Natick, MA, is the Army Materiel Command's (AMC's) research, development and engineering center dedicated to maximizing the soldier's survivability, sustainability, mobility, combat effectiveness, and quality of life by treating the soldier as a system. As such, NSC is responsible for a full spectrum of soldier and soldier support research and development (R&D), including combat rations and field feeding, aerial delivery, personnel parachutes, individual and collective protection, clothing and individual equipment, shelters, and organizational equipment.

Situated near the Army's birthplace, NSC is also the birthplace of the soldier-as-a-system concept. NSC's focus has always been soldier-centric, from its early manifestation in the Soldier Integrated Protective Ensemble Advanced Technology Demonstration (ATD), through transition to the PM-managed Land Warrior (LW) Program, to the current Objective Force Warrior (OFW) ATD supporting the Army's transformation to the Objective Force. In addition, NSC's precision airdrop technology program will provide critical technologies and the initial system

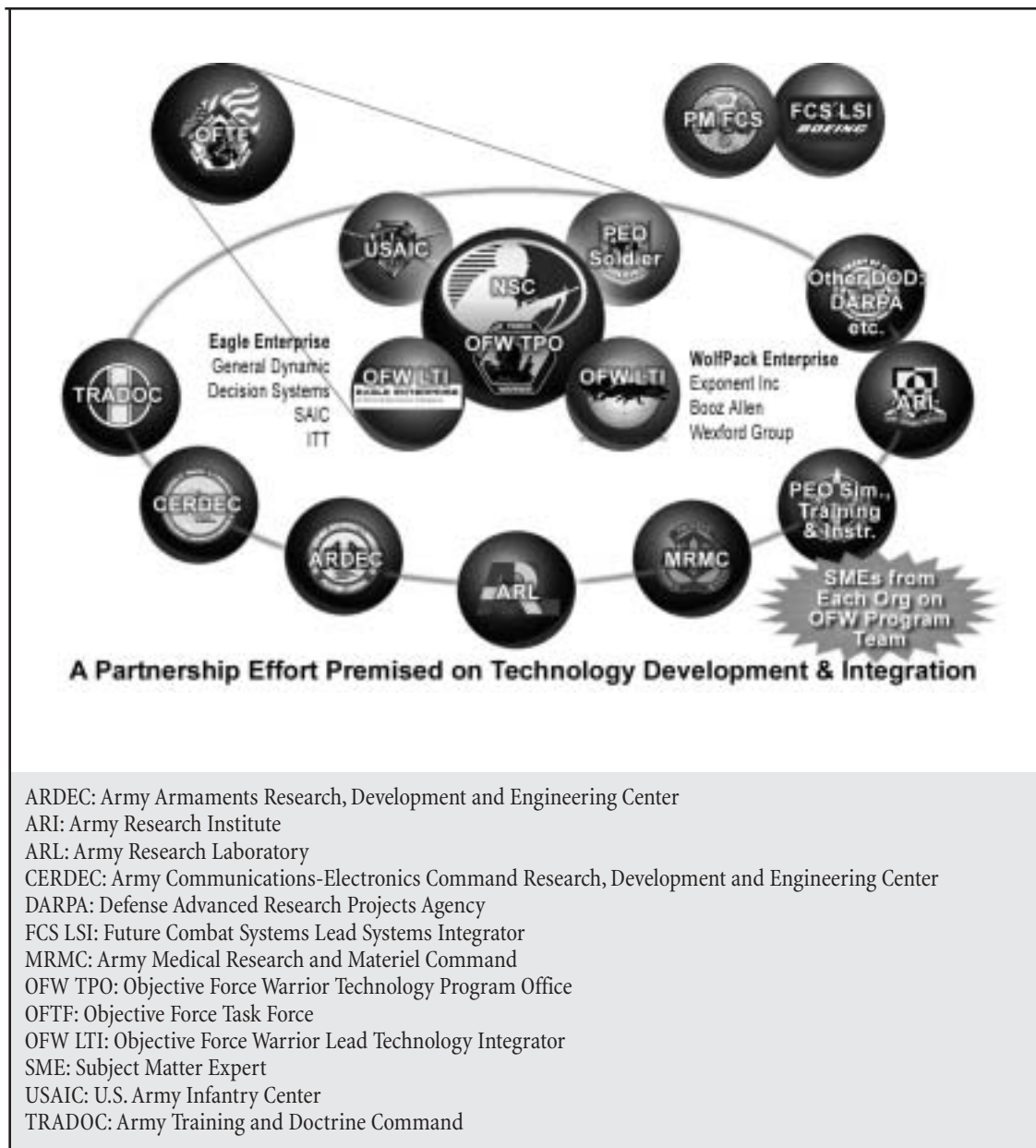
integration necessary for the Precision, Extended Glide Airdrop System, a cornerstone of the Army's logistics transformation strategy. Essentially, everything the soldier wears, carries, or consumes is either designed, developed, or integrated at NSC.

## Technology Integration

One of the key tenets of AMC's new Research, Development and Engineering Command (RDECOM) is integration. NSC leads or co-leads numerous forums to ensure integration of R&D across the full spectrum of activities. For example, NSC chairs the Office of the Secretary of Defense (OSD)-chartered Warrior Systems Technology Base Executive Steering Committee; the OSD TARA (Technology Area Review and Assessment) Protection, Sustainment, and Physical Performance technology subarea; leads the Joint Committee on Tactical Shelters as Executive Secretary; and co-chairs the Joint Technical Airdrop Group. Two areas where technology integration is of significant importance are the DOD Combat Feeding Program and the OFW ATD. The Army is the DOD Executive Agent for Combat Feeding and NSC executes the major portion of this responsibility through development of technologies for field food service equipment and combat feeding systems

for all Services. In the ration area, NSC has responsibility for the entire life cycle (science and technology (S&T) through supporting Defense Logistics Agency war reserves). An effective leveraging program is in place to include a strong partnership with the Research and Development Associates (R&DA), a trade association of government agencies, academia, and industry. Under this streamlined process, warfighter-suggested ration improvements enter the procurement cycle in only 18 months.

The OFW ATD is the Army's premier S&T program for integration of soldier-system focused technologies. Under NSC leadership, the OFW technical team is comprised of subject matter experts from across the Army S&T community, including most of the other RDECOM elements. (See the illustration on Page 19.) Systems engineering and strategic partnerships are key components of the glue that binds the OFW effort. In addition to the collaboration within the S&T community and with the lead technology integrator (LTI) contractor teams, NSC maintains strong partnerships with the U.S. Army Training and Doctrine Command (TRADOC) and Program Executive Office (PEO), Soldier. TRADOC has participated from the inception of the OFW Program and will, in parallel with NSC LTI support, develop the Operational Requirements Document for the Land Warrior-Advanced Capability (LW-AC). TRADOC's approved Soldier-as-a-System Mission Needs Statement represents a paradigm shift in how the Army manages the soldier as a system. As acquisition partners, NSC and PEO, Soldier have worked diligently to craft a tightly coupled S&T and acquisition strategy to ensure rapid, mature technology transition and insertion to achieve fielding of LW-AC. In fact, the OFW Executive Integrated Product Team is co-chaired by the NSC Director; the Commanding General, U.S. Army Infantry Center and School; and PEO, Soldier. The



OFW Program is truly a model of extensive horizontal and vertical integration.

### Modeling And Simulation

NSC uses modeling and simulation (M&S) analysis throughout its varied commodity areas. M&S is an integral part of NSC's research in areas such as nutritional models for combat rations, parachute systems designs, predictive models for airbeam shelters, and casualty-reduction assessments for soldier protection. To respond to the need

for soldier systems analysis and assessment, NSC has transitioned from a collection of individual, threat-based models to an integrated, soldier-centric model called the Integrated Unit Simulation System (IUSS). IUSS allows analysts of the complex interrelationships among soldiers, their equipment, and the battlefield dynamics to assess the effectiveness of our forces based on the contributions of individual soldiers. IUSS supports program managers (PMs) in making informed decisions through the

application of Simulation and Modeling for Acquisition, Requirements and Training (SMART) to reduce acquisition time, avoid program costs, reduce program risk, and support development of better soldier systems and individual equipment. In recent years, NSC has worked with industry, academia, and other government and international agencies to integrate intelligent, goal-based behavior in IUSS to better represent dismounted warrior performance, situational awareness, and decisionmaking.

## The Need For Speed

Technology integration is all for naught unless the new technology gets into the hands of soldiers as rapidly as possible. NSC efforts in this area range from addressing immediate needs of the current force through quick-reaction programs, partnering with PEOs, PMs, and users to transition mature technologies; and transitioning key technological developments to the commercial sector.

Quick response to combatant commander needs can significantly enhance unit capabilities. During 2002, NSC Large Area Maintenance Shelter technical assistance teams deployed in support of Operation Enduring Freedom for 517 workdays. NSC's command post building blocks, collective protection components, and solar covers were developed and delivered for immediate use by the U.S. Central Command for their deployable command post. Working with PEO, Soldier, NSC also supported a rapid clothing and individual equipment fielding initiative for the 82nd Airborne Division. NSC teams originally developed many of these items for the U.S. Marine Corps and Special Operations Forces (SOF). Through unique partnerships in the Combat Feeding program, the Meal, Ready-to-Eat (MRE) has expanded to 24 different menus with more than 120 new components added during the past 9 years.

Recent NSC developments in conductive (electro) textiles have transitioned to PEO, Soldier, improving integration of electronic subsystems into protective clothing. This same technology development has already found its way into commercial applications. Both Lands' End and Malden Mills Manufacturing Inc. collaborated to use NSC-developed "power-bus" technology for their wireless electric blankets that are now commercially available.

Another significant transition success story is the Interceptor Body Armor and Small Arms Protective

Insert developed by NSC for the Marine Corps and leveraged by the Army. Through advancement of new, lightweight ceramic composite materials, NSC was successful in achieving a 13-percent weight reduction in the ballistic vest and more than 40-percent weight reduction in the ballistic insert. This was accomplished without performance degradation and while addressing a new blunt-trauma requirement. In conjunction, NSC successfully executed a manufacturing technology program that evaluated the different ballistic plate materials and manufacturing processes. This resulted in a technology that is not only mass producible, but reduces the cost by 25 percent. Undoubtedly, the most meaningful result is the soldiers' lives saved by this technology advancement. As the Under Secretary of Defense for Acquisition, Technology, and Logistics E.C. "Pete" Aldridge noted, "Every bullet deflected by advanced body armor represents a visit not paid to a spouse or parent by a military chaplain."

## Workforce Rejuvenation

NSC's mission requires broad but unique disciplines—from food and textile technology, aeronautical engineering, and rigging to anthropology, biomechanics, and human factors engineering. Career development is an NSC priority as evidenced by the fact that about half of the scientific and engineering workforce has advanced degrees and 90 percent of the acquisition workforce has at least one certification. Many have double and triple certifications in multiple acquisition career fields. Targeting the abundance of colleges and universities surrounding Natick, NSC has recently hired more than 61 employees (12 percent of the NSC workforce) in entry-level programs. The average age of these new employees is 26 with a grade point average of 3.3 (compared to the average of 2.4 for interns in the Northeast). Of particular note, 45 percent

of the new interns have advanced degrees. They represent the latest in technological skills (e.g., biomechanics, fire science, and nanotechnology) from such institutions as the Massachusetts Institute of Technology (MIT), the University of Massachusetts, and the Worcester Polytechnic Institute. NSC's recruiting success is a significant accomplishment because Massachusetts is one of the country's leading technology states, and the competition for technically trained personnel is particularly intense.

In a unique partnership with the local union and with feedback from employees, NSC is proposing a reinvention laboratory personnel demonstration project to achieve flexible, streamlined merit processes to attract, develop, reward, and retain the most talented and dedicated workforce, which will ensure that NSC, RDECOM, and AMC remain at the forefront of superior technology generation and application.

## Conclusion

NSC is positioned to continue to transform itself to meet Army objectives for the future. Acquisition, partnership/relationship, workforce, and organizational transformation are all components of NSC's future direction. But at the heart of it all, NSC will continue to do what has been its hallmark for the past 49 years: *doing something for the soldier EVERY DAY.*

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